

Mini Thermalaire EP

Electric-Powered Thermal Glider



INSTRUCTIONS FOR FINAL ASSEMBLY

WATTAGE

Product Part Number 128422

Specifications:

- Wing Span: 60 Inches
- Wing Area: 355 Square Inches
- Length: 34.75 Inches
- Weight RTF: 22-25 Ounces Ready to Fly
- Wing Loading: 9-10.5 Ounces Per Square Foot
- Functions: Elevator, Rudder and Throttle
- Power: 380/SP400 Direct Drive w/6 x 3 Folding Propeller
- Radio: 3 Channel Micro w/2 Micro Servos & 15 AMP ESC

The Wattage Mini Thermalaire EP is distributed exclusively by Global Hobby Distributors 18480 Bandilier Circle, Fountain Valley, CA 92708

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TABLE OF CONTENTS

Safety Warning	2
Introduction	3
Section 1: Our Recommendations	4
Section 2: Tools and Supplies Required	5
Section 3: Kit Contents	6
Section 4: Metric Conversion Chart	6
Section 5: A Note About Covering	7
Section 6: Replacement Parts	7
Section 7: Motor Break-In (Optional)	8
Section 8: Wing Assembly	9
Section 9: Wing Mounting	12
Section 10: Stabilizer Installation	14
Section 11: Motor Installation	17
Section 12: Control System Installation	18
Section 13: Final Assembly	21
Section 14: Balancing the Mini Thermalaire EP	24
Section 15: Control Throws	24
Section 16: Preflight Check & Safety	25
Section 17: Flying the Mini Thermalaire EP	26
Section 18: Basics of Thermal Flying	28
Section 19: Glossary of Terms	29
Product Evaluation Sheet	31

SAFETY WARNING

This R/C airplane is not a toy! If misused or abused, it can cause serious bodily injury and/or damage to property. Fly only in open areas and preferably at a dedicated R/C flying site. We suggest having a qualified instructor carefully inspect your airplane before its first flight. Please carefully read and follow all instructions included with this airplane, your radio control system and any other components purchased separately.

FOR YOUR INFORMATION

To make your modeling experience totally enjoyable, we recommend that you get experienced, knowledgeable help with assembly and during your first flights. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors. If there is no hobby shop in your area, we recommend that you contact the AMA at the address below. They will be able to help you locate a flying field near you.

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie IN 47302-9252
(800) 435-9262
www.modelaircraft.org

OUR GUARANTEE

Wattage guarantees this kit to be free from defects in both material and workmanship, at the date of purchase. This does not cover any component parts damaged by use, misuse or modification. In no case shall Wattage's liability exceed the original cost of the purchased kit.

In that Wattage has no control over the final assembly or material used for final assembly, no liability shall be assumed for any damage resulting from the use by the user of the final user-assembled product. By the act of using the final user-assembled product, the user accepts all resulting liability.

INTRODUCTION

Thank you for purchasing the new Wattage Mini Thermalair EP. Before completing the final assembly of your new airplane, please carefully read through this instruction manual in its entirety. Doing so will ensure your success the first time around!

Wattage Mini Thermalair EP Features:

- Built-Up Balsa and Plywood Fuselage & Balsa Tail Surfaces
- Balsa Sheeted Foam-Core Wing with Lightning Holes
- Great Flight Characteristics Both Under Power and In Thermals
- Accepts Inexpensive 380/Speed 400 Motors or More Powerful Cobalt 400 Motors
- All Hardware and Custom Decal Set Included
- Fast and Easy Assembly - Over 35 High Resolution Digital Photos to Guide You

This instruction manual is designed to guide you through the entire final assembly process of your new airplane in the least amount of time possible. Along the way you'll learn how to properly assemble your new airplane and also learn tips that will help you in the future. We have listed some of our recommendations below. Please read through them before beginning assembly.

- Please read through each step before beginning assembly. You should find the layout very complete and straightforward. Our goal is to guide you through assembly without any of the headaches and hassles that you might expect.
- There are check boxes next to each step. After you complete a step, check off the box. This will help prevent you from losing your place.
- Cover your work table with brown paper or a soft cloth, both to protect the table and to protect the parts.
- Keep a couple of small bowls or jars handy to put the small parts in after you open the accessory bags.
- We're all excited to get a new airplane in the air, but take your time. This will ensure you build a straight, strong and great flying airplane.
- If you come across this symbol , it means that this is an important point or an assembly hint.

If you should find a part missing or damaged, or have any questions about assembly, please contact us at the address below:

Wattage Customer Service
18480 Bandilier Circle
Fountain Valley CA 92708

Phone: (714) 963-0329 Fax: (714) 964-6236 E-mail: service@globalhobby.net

To serve your needs better, please include your email address with any correspondence you send to us. Your email address will be added to our Customer Service Database so you will automatically receive free updates and tech notices for your particular product. You will also receive repair status updates (if applicable) and other important information about your product as it becomes available.

IMPORTANT INFORMATION ABOUT YOUR EMAIL ADDRESS

Global Hobby Distributors will not disclose the information it collects to outside parties. Global Hobby Distributors does not sell, trade, or rent your personal information to others. Your privacy is important to us.

SECTION 1: OUR RECOMMENDATIONS

This section describes the items you will need to purchase for your new Mini Thermalaire EP. These suggestions are not set in stone, but they should provide you with a good starting point.

IMPORTANT

When choosing accessories for your Mini Thermalaire, such as servos, ESC, and receiver, it's very important to take the weight of these items into consideration. Remember, the lighter the overall weight of the finished airplane, the better the airplane will fly.

What Motor & Propeller Do I Use?

For good overall power an inexpensive 380/Speed 400 size direct drive motor with a 6 x 3 folding propeller is ideal. We suggest using a folding propeller to optimize drag while gliding and thermaling. If you want more power, a more expensive Cobalt 400 direct drive motor with a 7 x 4 folding propeller will also work very well.

What Servos Do I Use?

The servos you use should be the lightest available, yet still have an adequate amount of torque. We suggest using servos that weigh no more than 0.32 ounces and have a torque rating of no less than 7.0 ounces per square inch.

What Receiver Do I Use?

The receiver should be as light as possible, preferably 1/2oz. or less. Most four-channel micro receivers would be a good choice. The receiver that comes with the Hitec Focus III AM radio system would also work well. We don't suggest using short-range receivers like the Hitec Feather or Cirrus MRX-4 unless you plan on flying your Mini Thermalaire close-in. If you plan on thermal flying, the range provided by these receivers will not be long enough for you to keep control of the airplane in thermals.

Note: If you plan on using the HAS-3MB receiver included with the Focus III AM radio system, we suggest removing the case to reduce the receiver's weight and overall size. If you do remove the case from your receiver we strongly suggest wrapping the receiver with heat-shrink material to protect the internal components.

What Electronic Speed Control Do I Use?

The ESC you choose should be capable of handling 10-15 amps continuous current. Again, lighter is better. Your ESC should weigh no more than 1 ounce including the wiring and switch.

Note: The continuous current rating we recommend for your ESC is based on the use of a standard 380 or Speed 400 size motor, 6 x 3 propeller and 8 Cell 500AR NiCD battery pack. The current draw of this power system is well within the 10 - 15 amps range. If you decide to use a different motor, propeller and battery combination, we suggest first checking how many amps your particular power system draws. You can then determine exactly what size ESC you need.

What Flight Battery Do I Use?

To get good flight performance you need to use the right type of flight battery. You need a flight battery that can deliver enough voltage for strong climb-out and give you adequate duration, but not weigh so much that the airplane does not fly good. Through much testing we have found that 8 cell 500Mah AR NiCD battery packs and 8 cell 600Mah AE battery packs work great. They provide excellent power, good duration and don't weigh more than the airplane can handle - even for thermal flying.

Note: At the time of this writing, most NiMH batteries cannot withstand continuous current draw over 10 amps, so we don't recommend using them with this power system. NiMH battery technology is evolving quickly, so in the future they may be able to handle higher current draw and therefore be usable with this power system.

Here's What We Used to Finish Our Mini Thermalaire EP:

P/N 759118	Hitec 555 Micro Receiver
	Hitec Dual Conversion FM RX Crystal
P/N 444227	Cirrus CS-21 Micro Servos (2)
P/N 128484	Wattage IC-15A Micro ESC
P/N 128519	Wattage 8 Cell 500AR 2/3A NiCD Flight Battery
P/N 131338	Wattage 380 Direct Drive Motor
P/N 648768	Graupner 6 x 3 Folding Propeller Set
P/N 130103	Wattage 7-8 Cell AC/DC Peak Charger
P/N 131175	Wattage 14 Gauge Hi-Temp Silicon Wire
P/N 869020	Dubro Double-Sided Tape

OPTIONAL

For more power for those extra-quick, long, steep climbs try our Cobalt 400 motor with 7 x 4 folding propeller in your Mini Thermalaire EP. You won't be disappointed!

P/N 131480	Wattage Super 400 Cobalt Motor
P/N 131203	Wattage 7 x 4 Folding Propeller Set

IMPORTANT

The part numbers listed for the Hitec receiver, Cirrus servos and Wattage ESC are compatible with Hitec and JR (receiver is compatible with Hitec only) radio control systems. These items are also available with connectors that are compatible with Futaba and Airtronics radio control systems. (Micro 555 receiver is also available for Airtronics, Futaba and JR radio systems.)

When you purchase the Hitec Micro 555 receiver, you must also purchase a Hitec brand crystal compatible with the receiver. The crystal must also be on the same frequency as your transmitter. Note that the Micro 555 receiver uses a dual conversion FM Hitec crystal.

SECTION 2: TOOLS AND SUPPLIES REQUIRED

- | | |
|--|--|
| ☐ Kwik Bond 5 Minute Epoxy # 887560 | ☐ Ruler |
| ☐ Kwik Bond Thin C/A # 887500 | ☐ Pencil |
| ☐ Kwik Bond Thick C/A # 887510 | ☐ Builder's Triangle |
| ☐ # 0 Phillips Head Screwdriver | ☐ Masking Tape |
| ☐ # 1 Phillips Head Screwdriver | ☐ 220 Grit Sandpaper w/Sanding Block |
| ☐ Magnum Z-Bend Pliers # 237473 | ☐ Paper Towels |
| ☐ Wire Cutters | ☐ Rubbing Alcohol |
| ☐ Needle Nose Pliers | ☐ NHP Epoxy Mixing Sticks # 864204 |
| ☐ Adjustable Wrench | ☐ NHP Epoxy Mixing Cups # 864205 |
| ☐ Excel Modeling Knife # 692801 | ☐ K&S 30 Watt Soldering Iron # 598120 |
| ☐ Scissors | ☐ Heat-Shrink Tubing |
| ☐ Electric or Hand Drill | ☐ Solder |
| ☐ Assorted Drill Bits | |

To break in your motor you will need:

- | | |
|--|---------------------------------------|
| ☐ Emerald Performance Plus Motor Spray # 340186 | ☐ Rubber Bands |
| ☐ Trinity Motor Break In Drops # 840768 | |

Motor break-in is optional, but highly recommended.

SECTION 3: KIT CONTENTS

We have organized the parts as they come out of the box for easier identification during assembly. Before you begin assembly, group the parts like we list them below. This will ensure that you have all of the parts before you begin assembly and it will also help you become familiar with each part. If you find any parts missing or damaged, please contact us at the address below:

Wattage Customer Service
18480 Bandilier Circle
Fountain Valley CA 92708

Phone: (714) 963-0329

Fax: (714) 964-6236

E-mail: service@globalhobby.net

AIRFRAME ASSEMBLIES

- ☐ (1) Fuselage w/Forward Hatch Cover
- ☐ (1) Left & Right Wing Panels
- ☐ (1) Horizontal Stabilizer w/Elevator
- ☐ (1) Vertical Stabilizer w/Rudder

MISCELLANEOUS WING PARTS

- ☐ (2) Plywood Wing Bolt Doublers (W12)
- ☐ (1) Aluminum Dihedral Brace
- ☐ (1) 3mm x 25mm Machine Screw
- ☐ (1) 3mm x 18mm Machine Screw
- ☐ (2) 3mm Flat Washers
- ☐ (2) 3mm Blind Nuts

CONTROL SYSTEM ASSEMBLIES

- ☐ (2) Threaded Pushrod Wires
- ☐ (2) Nylon Control Horns w/Backplates
- ☐ (2) Nylon Clevises
- ☐ (4) 2mm x 8mm Machine Screws
- ☐ (1) Length of Clear Tubing

MISCELLANEOUS FUSELAGE PARTS

- ☐ (1) 3mm x 12mm Wood Screw
- ☐ (1) 3mm Flat Washers
- ☐ (2) 2.5 x 8mm Machine Screws
- ☐ (2) 2.5mm Flat Washers
- ☐ (1) Velcro® Strip
- ☐ (1) Decal Set

SECTION 4: METRIC CONVERSION CHART

To convert inches into millimeters: Inches x 25.4 = mm

To convert millimeters into inches: Millimeters / 25.4 = in

1/64"	=	.4mm	3/16"	=	4.8mm	1"	=	25.4mm	21"	=	533.4mm
1/32"	=	.8mm	1/4"	=	6.4mm	2"	=	50.8mm	24"	=	609.6mm
1/16"	=	1.6mm	3/8"	=	9.5mm	3"	=	76.2mm	30"	=	762.0mm
3/32"	=	2.4mm	1/2"	=	12.7mm	6"	=	152.4mm	36"	=	914.4mm
1/8"	=	3.2mm	5/8"	=	15.9mm	12"	=	304.8mm			
5/32"	=	4.0mm	3/4"	=	19.0mm	18"	=	457.2mm			

SECTION 5: A NOTE ABOUT COVERING

The covering material used on the Mini Thermalaire EP is real iron-on heat shrink covering material, not cheap "shelf paper." Because of this, it is possible with heat and humidity changes that the covering on your airplane may wrinkle or sag. This trait is inherent in all types of heat shrink material. To remove any wrinkles that might be visible you will need to purchase, or borrow from a fellow modeler, a heat iron. If you need to purchase one, the Global Heat Sealing Iron # 360900 is recommended.

Follow this simple procedure to remove the wrinkles:

❑ Plug in and turn on the sealing iron to the medium-high temperature setting. Allow the iron to heat up for approximately 5 - 7 minutes.

❑ After the iron has reached temperature, lightly apply the iron to the wrinkled section of the covering. Move the iron slowly over the wrinkled section until the covering tightens and the wrinkles disappear. You will notice that the color of the covering will darken when it is heated. When the covering cools back down, it will return to its normal color.

👉 If the color layer smears from any of the seams the temperature of the iron is too hot. Turn the temperature dial down and wait about 5 minutes for the iron to adjust to the lower temperature. You can remove any excess color streaks using a paper towel soaked with a small quantity of Acetone.

WARNING

We do not suggest storing your airplane in an extremely hot environment (like the back of your car in direct sunlight) for any length of time. The extreme heat could cause the covering material to wrinkle or sag and possibly damage the fragile components of the radio control system.

SECTION 6: REPLACEMENT PARTS

Wattage stocks a complete line of replacement parts for your Mini Thermalaire EP. Listed below are the replacement parts that are available along with their respective part numbers for easy ordering convenience. We suggest ordering directly from your local dealer. If your dealer does not stock Wattage products, you can order directly from us at the address shown below:

Global Hobby Distributors
18480 Bandilier Circle
Fountain Valley CA 92728

Phone: (714) 963-0329 Fax: (714) 964-6236

Mini Thermalaire EP - Complete -----	128422	Hardware Set -----	150559
Wing Set -----	150555	Instruction Manual -----	150560
Wing Screw Set -----	150556	Decal Set -----	150561
Fuselage Set -----	150557	Motor Screw Set -----	131360
Stabilizer Set -----	150558		

SECTION 7: MOTOR BREAK-IN (OPTIONAL)

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- | | |
|---|---|
| ☐ Wire Cutters | ☐ Solder |
| ☐ 220 Grit Sandpaper w/Sanding Block | ☐ Emerald Performance Plus Motor Spray |
| ☐ Paper Towels | ☐ Trinity Motor Break In Drops |
| ☐ K&S 30 Watt Soldering Iron | ☐ Rubber Bands |

IMPORTANT

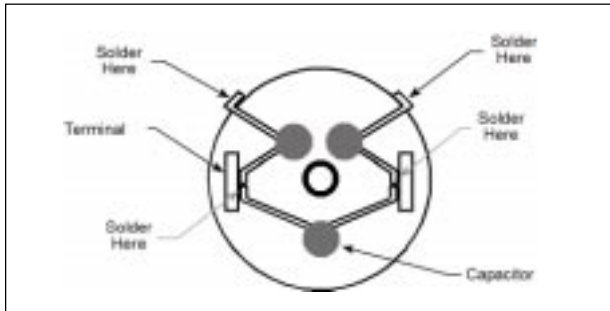
Before installing your motor into the airplane it should first be broken in. This accomplishes two very important things: breaking in the motor will maximize its performance, and, most importantly, you will be able to verify that the motor is working properly before installing it into the airplane. It is strongly suggested that you not skip this important section.

To break in your motor, it is recommended that the motor be run for at least 10 minutes without a propeller at a voltage of less than 5 volts - a 4 cell receiver battery pack works great for this. The low voltage will keep the motor from overheating while the brushes and bushings seat. Please follow the procedures below for proper motor break-in.

👉 If you're using a Cobalt motor, please refer to the manufacturer recommendations for break-in.

Step 1: Installing the Noise-Suppression Capacitors & Motor Wires

If noise-suppression capacitors are not included with your motor, they can usually be found included with your ESC. Noise-suppression capacitors should be installed onto the motor to prevent radio interference. It is strongly suggested that you take the time to install them.



- ☐ If your motor does not come with noise-suppression capacitors already soldered in place, you should solder three onto the motor as shown. Two capacitors should be soldered between the terminals and the can and one capacitor should be soldered between the two terminals.

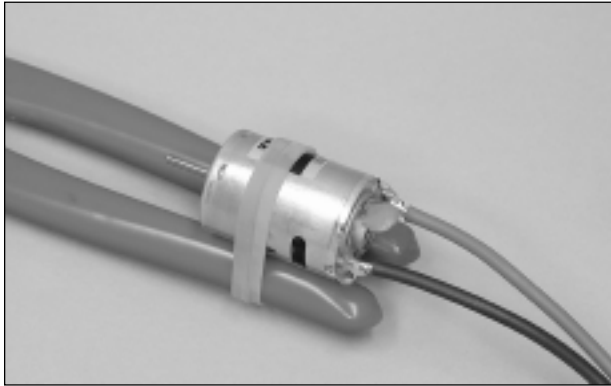
👉 So the solder will stick to the motor can, you should roughen the side of the can with 220 grit sandpaper first.



- ☐ Solder two 10" long 14 gauge hi-temp silicon motor wires to the positive and negative terminals on the back of your motor.

👉 Most motors have a red dot and/or a "+" sign next to the positive motor terminal.

Step 2: Breaking In the Motor



- ❑ Set your motor between the handles of a pair of wire cutters and secure the motor to the handles using several rubber bands. This will keep the motor secure enough for the break-in procedure.

- ❑ Before operating the motor, apply a couple of drops of Break In Drops to the motor bushings. (One at the front and one at the back of the motor.)
- ❑ Operate the motor using a fully charged 4 cell battery pack and allow the motor to run for about 8 - 10 minutes. After 8 - 10 minutes, remove the battery pack and spray Motor Spray into the motor (through the two holes in the side of the motor) to clean the brushes. Apply more Break In Drops to the bushings and run the motor for another 3 - 5 minutes.
- ❑ After 3 - 5 minutes, remove the battery pack from the motor and spray the brushes clean with Motor Spray. Apply a couple of drops of Break In Drops to the bushings and wipe the motor clean using a paper towel.
- ❑ Now that you've completed breaking in your motor, remove the motor and set it aside for installation later.

SECTION 8: WING ASSEMBLY

YOU'LL NEED THE FOLLOWING PARTS:

- | | |
|--------------------------------|-------------------------------|
| ❑ (1) Left & Right Wing Panels | ❑ (1) Aluminum Dihedral Brace |
|--------------------------------|-------------------------------|

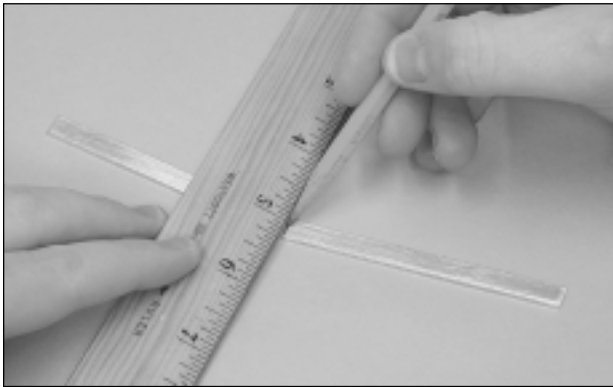
YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- | | |
|----------------------------|--------------------------------------|
| ❑ Kwik Bond 5 Minute Epoxy | ❑ 220 Grit Sandpaper w/Sanding Block |
| ❑ Excel Modeling Knife | ❑ Paper Towels |
| ❑ Ruler | ❑ Rubbing Alcohol |
| ❑ Pencil | ❑ NHP Epoxy Mixing Sticks |
| ❑ Masking Tape | ❑ NHP Epoxy Mixing Cups |

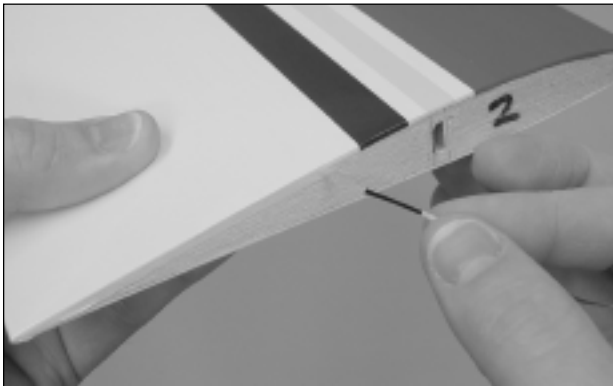
Step 1: Aligning the Wing Panels and the Aluminum Dihedral Brace

- ❑ Using 220 grit sandpaper with a sanding block, lightly sand the edges and sides of the aluminum dihedral brace to roughen the surface.

👉 Roughening the surface of the aluminum will allow the epoxy to adhere better, increasing the overall strength of the wing center section joint. Do not omit this procedure.



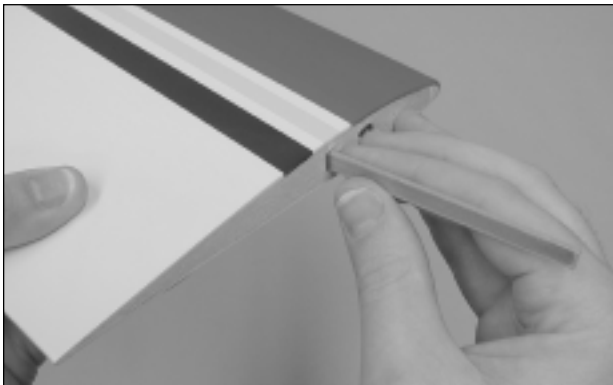
- ❑ Using a ruler and a pencil, carefully measure and mark the centerline of the dihedral brace. Do this on both sides.



- ❑ Using a modeling knife, cut away and remove the excess covering material that overlaps onto the root ribs of each wing panel, leaving about 1/16" overlapped so it does not pull away.

IMPORTANT

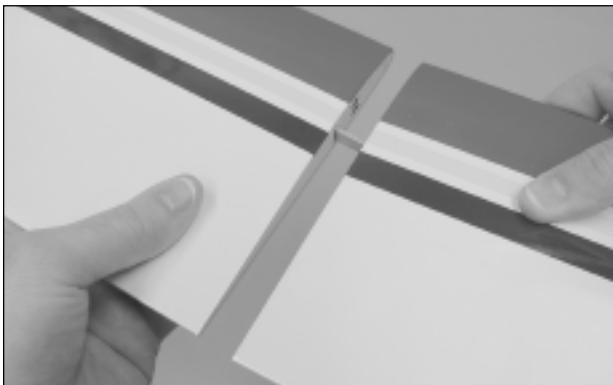
It's very important to the integrity of the wing center section joint that you remove as much covering material from the root ribs as possible.



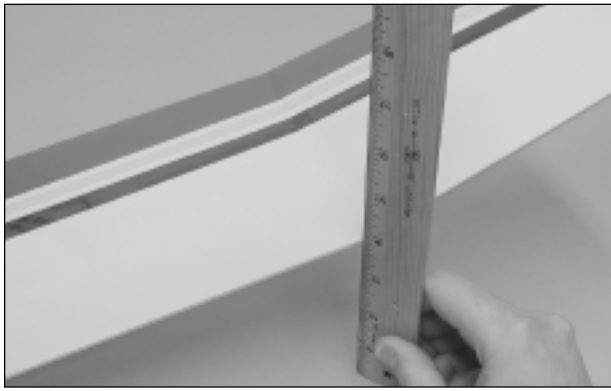
- ❑ Test-fit the dihedral brace into each wing panel. It should slide easily into each panel up to the centerline you drew.

WARNING

The dihedral brace is cut in the shape of a "V". The "V" shape should face the top surface of the wing when the brace is installed.



- ❑ Slide both wing panels together with the dihedral brace temporarily installed (without using glue).
- ❑ Look carefully at the center section joint: the wing panels should fit together tightly with few or no gaps in the joint.



- ❑ Double-check that the amount of dihedral in the wing is correct. To do this, do the following: with one wing panel flat on your work table, check the amount the opposite wing panel is off the table. This measurement should be about 3-3/4" at the trailing edge where the outer and inner wing panels are prejoined.

- ❑ When satisfied with the fit and alignment, pull the wing panels apart and remove the dihedral brace.

Step 2: Joining the Wing Panels



- ❑ Apply a long strip of masking tape to the top and bottom edges of the root rib on each wing panel.

☞ The masking tape will prevent excess epoxy from getting onto the wing panels when you join them.

- ❑ Mix a generous amount of 5 minute epoxy. Working with only one wing panel for now, apply a thin layer of epoxy inside the dihedral brace box and to only half of the dihedral brace. Make sure to cover the top and bottom, as well as the sides, and use enough epoxy to fill any gaps.

WARNING

Make sure that the top of the dihedral brace is toward the top of the wing when you glue it into place.

- ❑ Slide the dihedral brace into the wing panel up to its centerline. Quickly remove any excess epoxy using a paper towel and rubbing alcohol, and allow the epoxy to set up before proceeding.
- ❑ After the epoxy has set up, test-fit both wing panels together again to double-check that they still fit together properly. Check the leading and trailing edges, too. It's important that they be even with each other.
- ❑ Mix a generous amount of 5 minute epoxy and apply a thin layer to the exposed half of the dihedral brace, the inside of the dihedral brace box in the second wing panel, and the entire surface of both root ribs. Make sure to use enough epoxy to fill any gaps.
- ❑ Slide the two wing panels together and realign them. Quickly wipe away any excess epoxy using a paper towel and rubbing alcohol, and use pieces of masking tape to hold the two wing panels aligned until the epoxy fully cures.

Step 3: Checking the Center Section Joint

- ❑ Once the epoxy has fully cured, remove the masking tape and double-check the center section joint. If any gaps are present, mix a small quantity of 5 minute epoxy and carefully fill any remaining gaps. Quickly remove any excess epoxy using a paper towel and rubbing alcohol, and allow the epoxy to thoroughly cure.

SECTION 9: WING MOUNTING

YOU'LL NEED THE FOLLOWING PARTS:

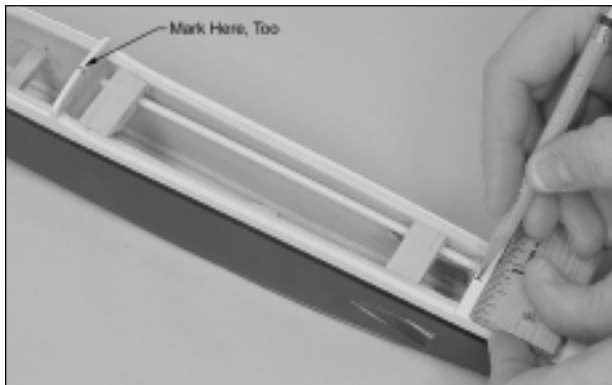
- ☐ (1) Fuselage w/Forward Hatch Cover
- ☐ (1) 3mm x 18mm Machine Screw
- ☐ (2) Plywood Wing Bolt Doublers (W12)
- ☐ (2) 3mm Flat Washers
- ☐ (1) 3mm x 25mm Machine Screw
- ☐ (2) 3mm Blind Nuts

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ☐ Kwik Bond Thin C/A
- ☐ 1/8" & 11/64" Drill Bits
- ☐ Kwik Bond Thick C/A
- ☐ Ruler
- ☐ # 1 Phillips Head Screwdriver
- ☐ Pencil
- ☐ Excel Modeling Knife
- ☐ Masking Tape
- ☐ Electric Drill

Step 1: Aligning the Wing

- ☐ Remove the forward hatch cover from the fuselage and set it aside for now.



- ☐ Using a ruler and a pencil, carefully measure and mark the fuselage centerline at both the front and the back of the wing saddle.

- ☐ Set the wing down into the wing saddle and align the centerline of the wing (the glue joint), at both the leading and trailing edges, with the fuselage centerline marks you drew.

- ☐ When satisfied with the alignment, hold the wing securely in place using several pieces of masking tape.

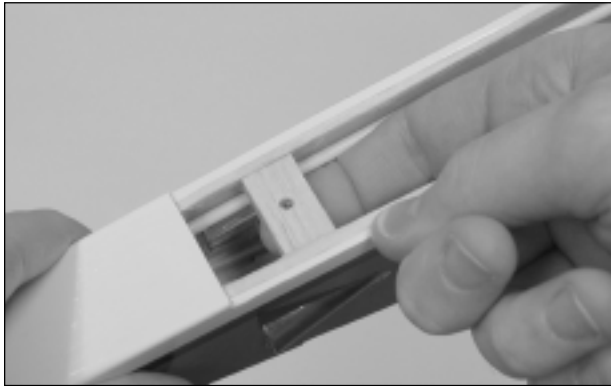


- ☐ Using a 1/8" drill bit, drill two holes into the centerline of the wing and through the plywood plates inside the fuselage for the wing hold-down screws. The front hole should be located 3/8" behind the forward bulkhead and the back hole should be located 7/8" in front of the trailing edge of the wing.

 Drill both holes straight down through the wing. Don't drill them at an angle.

- ☐ Remove the wing and enlarge only the two holes in the fuselage using an 11/64" diameter drill bit.

Step 2: Mounting the Wing



- ❑ Carefully push one 3mm blind nut up into each wing hold-down screw plate from the bottom, making sure the blind nuts are straight and completely seated into the balsa supports.

- ❑ After the blind nuts are pushed completely into the balsa supports, carefully apply a bead of thick C/A around each blind nut to hold them securely in place. The C/A will prevent the blind nuts from popping loose when installing the wing hold-down screws.

👉 Be very careful not to get C/A into the threads.

- ❑ Using a modeling knife, cut away and remove the covering material from over the predrilled hole in each wing bolt doubler (W12).

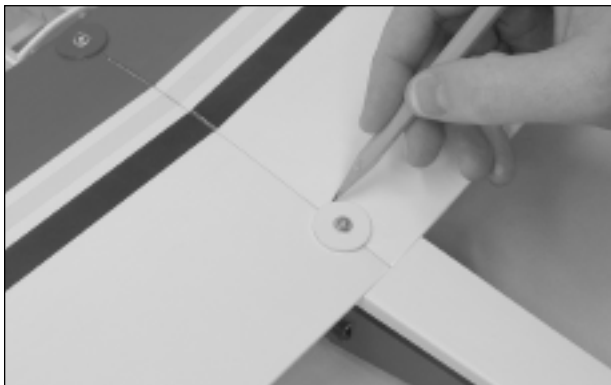


- ❑ Place the wing onto the fuselage and realign it. Secure it into place using the two wing bolt doublers, two 3mm diameter machine screws and two 3mm flat washers.

👉 The longer machine screw is used at the front of the wing. Also note that the wing bolt doublers are covered to match the color scheme on the wing.

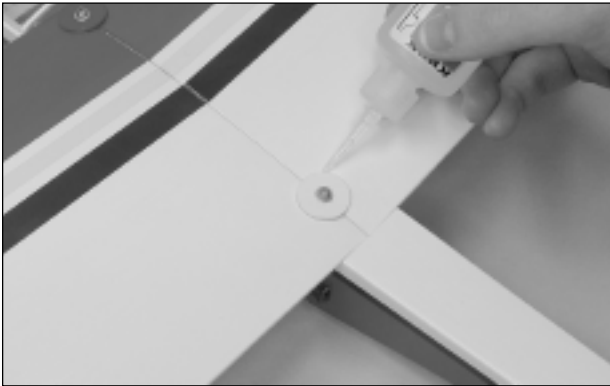
IMPORTANT

If you have trouble aligning the wing hold-down screws with the blind nuts, enlarge the holes in the wing using an 11/64" diameter drill bit. This will allow you to align the screws with the blind nuts easier.



- ❑ Carefully trace around each of the wing screw doublers using a pencil.

- ❑ Remove the wing screws, plywood doublers and wing from the fuselage.
- ❑ Using a modeling knife, cut away and remove the covering material from within the two outlines you drew on the wing.



- ❑ Reinstall the wing as you did before, then carefully glue each wing screw doubler to the wing using several drops of thin C/A.

☞ The thin C/A will "wick" into the joints, so be careful not to use so much that you glue the wing screws to the wing.

SECTION 10: STABILIZER INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS:

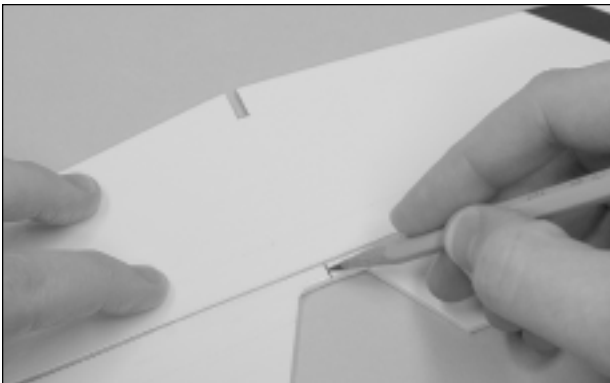
- | | |
|--|------------------------------------|
| ❑ (1) Horizontal Stabilizer w/Elevator | ❑ (1) Vertical Stabilizer w/Rudder |
|--|------------------------------------|

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

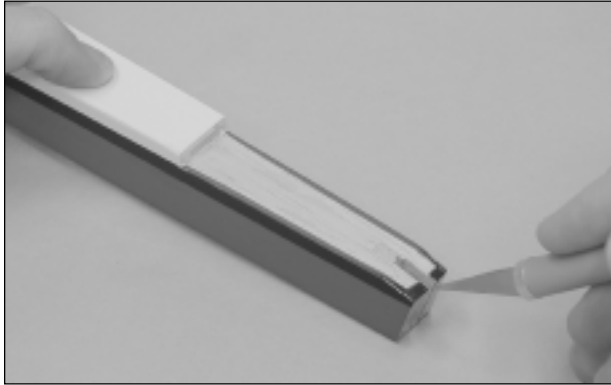
- | | |
|---|---|
| <ul style="list-style-type: none"> ❑ Kwik Bond 5 Minute Epoxy ❑ Excel Modeling Knife ❑ Ruler ❑ Pencil ❑ Builder's Triangle ❑ Masking Tape | <ul style="list-style-type: none"> ❑ 220 Grit Sandpaper w/Sanding Block ❑ Paper Towels ❑ Rubbing Alcohol ❑ NHP Epoxy Mixing Sticks ❑ NHP Epoxy Mixing Cups |
|---|---|

Step 1: Aligning the Horizontal Stabilizer

- ❑ Using a modeling knife, cut away and remove the covering material from over the precut slot in the middle of the leading edge of the horizontal stabilizer.

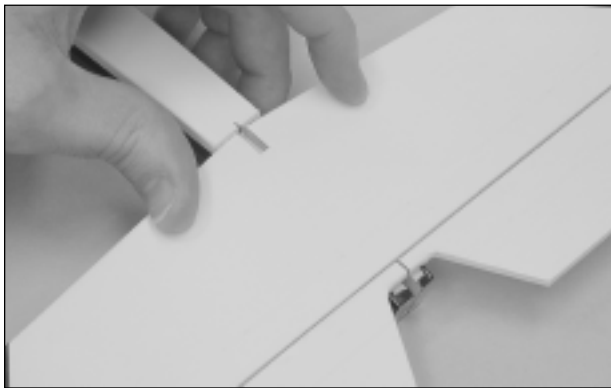


- ❑ Using a ruler and a pencil, draw a centerline mark on top of the elevator joiner as shown.



- ❑ Using a modeling knife, carefully cut away and remove the covering material from over the precut slot in the back of the fuselage and from on top of the stabilizer mounting platform.

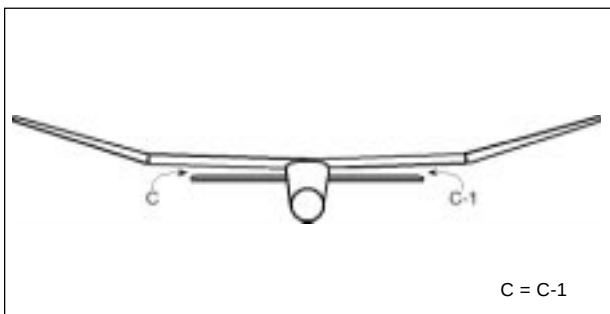
- ❑ Using a ruler and a pencil, measure and draw a centerline mark on top of the fuselage at the front of the stabilizer mounting platform.



- ❑ Set the stabilizer on top of the mounting platform, aligning the precut slot in the leading edge with the mark you drew on the mounting platform and aligning the mark on the elevator joiner with the precut slot in the back of the fuselage.

☞ The front of the stabilizer should be pushed up against the front of the stabilizer mounting platform.

- ❑ When satisfied with the alignment, use several pieces of masking tape to hold the stabilizer firmly to the fuselage.
- ❑ Temporarily mount the wing to the fuselage.



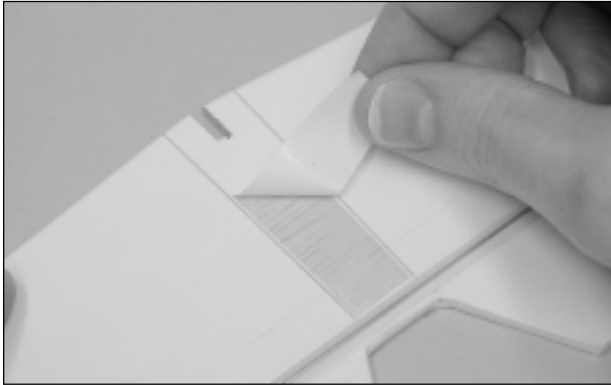
- ❑ With the stabilizer held firmly in place, look from the front of the airplane at both the wing and the stabilizer. When aligned properly, the stabilizer should be parallel with the wing.

IMPORTANT

If the stabilizer is out of alignment, remove it and use 220 grit sandpaper with a sanding block to sand down the higher side of the stabilizer mounting platform, then reinstall the stabilizer and check the alignment once more. Repeat this procedure until you are satisfied with the alignment.

Step 2: Mounting the Horizontal Stabilizer

- ❑ Once you're satisfied with the alignment, use a pencil to draw a line on each side of the stabilizer (on the bottom) where it meets the fuselage sides.
- ❑ After drawing the lines, remove the stabilizer from the fuselage.



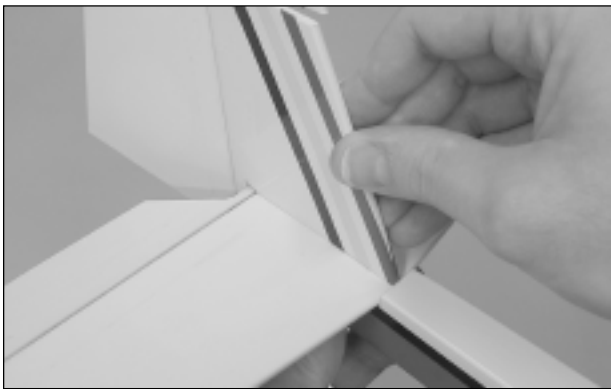
- ❑ Using a modeling knife, carefully cut away and remove the covering material from between the lines you drew on the bottom of the stabilizer.

WARNING

When cutting through the covering to remove it, cut only through the covering and not into the stabilizer. Cutting into the stabilizer can weaken it and result in a possible failure during flight.

- ❑ Mix a generous amount of 5 minute epoxy and apply a thin layer to the gluing surfaces on both the top of the mounting platform and the bottom of the stabilizer. Be sure to use enough epoxy to fill any gaps.
- ❑ Set the stabilizer into place and realign it, double-checking the alignment once more before the epoxy sets up. Remove any excess epoxy before it cures using a paper towel and rubbing alcohol, and hold the stabilizer in place until the epoxy sets up.

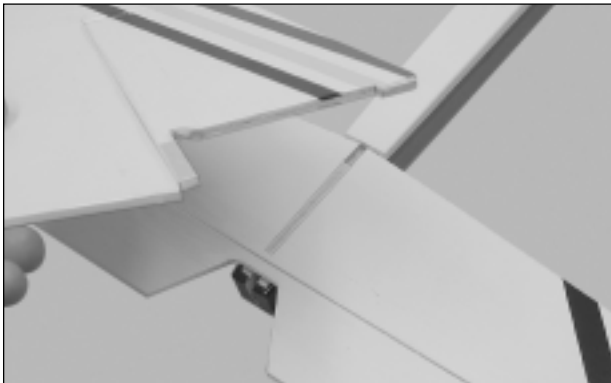
Step 3: Aligning the Vertical Stabilizer



- ❑ Set the vertical stabilizer into place. To align it properly, the tab in the front of the vertical stabilizer should fit in the precut slot in the horizontal stabilizer and the rudder post should fit down into the precut slot in the back of the fuselage. The vertical stabilizer should also be pushed down firmly against the horizontal stabilizer.

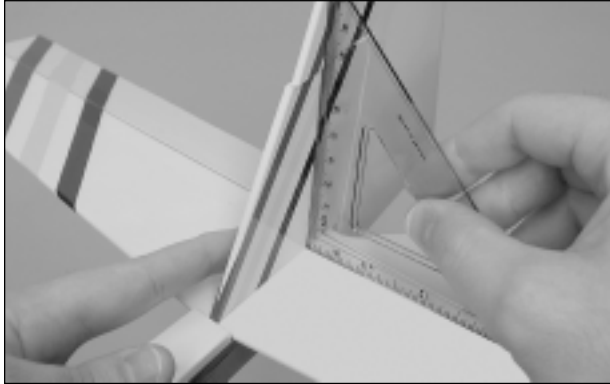
Step 4: Mounting the Vertical Stabilizer

- ❑ When satisfied with the alignment, use a pencil to outline the base of the vertical stabilizer onto the top of the horizontal stabilizer.



- ❑ Remove the vertical stabilizer and use a modeling knife to carefully cut away and remove the covering material from inside the outline you drew on the horizontal stabilizer.
- ❑ Carefully cut away and remove the covering material from the gluing surfaces on the vertical stabilizer.

- ❑ Mix a small quantity of 5 minute epoxy and apply a generous layer to the gluing surfaces on the vertical stabilizer, horizontal stabilizer and in the slot in the back of the fuselage.



- ❑ Set the vertical stabilizer back into place and realign it. Remove any excess epoxy using a paper towel and rubbing alcohol, and hold it in position until the epoxy sets up.

IMPORTANT

While the epoxy is setting up, use a builder's triangle to ensure the vertical stabilizer is aligned 90° to the horizontal stabilizer.

SECTION 11: MOTOR INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS:

- ❑ (2) 2.5mm x 8mm Machine Screws
- ❑ (2) 2.5mm Flat Washers

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ # 1 Phillips Head Screwdriver

Step 1: Installing the Motor

Before installing your motor, make sure you have soldered the motor wires and noise-suppression capacitors to the back of your motor. It's also a good idea to break in your motor before installing it. If you haven't done so already, turn back to page # 8 and follow the motor break-in procedures.

- ❑ Slide your motor through the hatch opening and line up the two threaded holes in the front of your motor with the two predrilled holes in the motor plate.



- ❑ Mount the motor to the motor plate using the two 2.5mm x 8mm machine screws and two 2.5mm flat washers. Tighten the machine screws firmly to hold the motor securely in place.

SECTION 12: CONTROL SYSTEM INSTALLATION

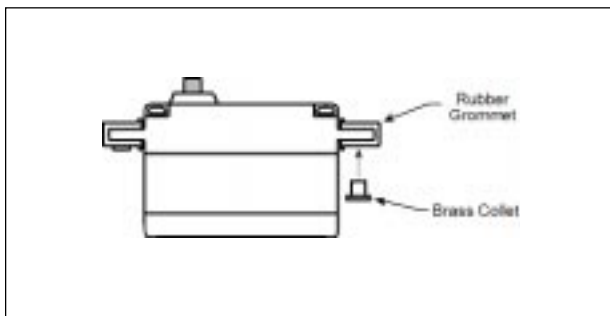
YOU'LL NEED THE FOLLOWING PARTS:

- ☐ (2) Threaded Pushrod Wires
- ☐ (2) Nylon Control Horns w/Backplates
- ☐ (2) Nylon Clevises
- ☐ (4) 2mm x 8mm Machine Screws
- ☐ (1) Length of Clear Tubing

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

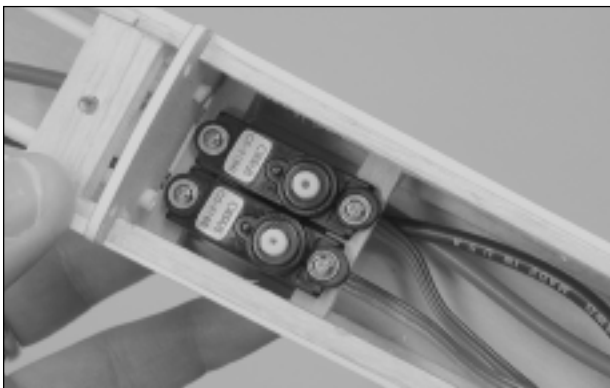
- ☐ # 0 Phillips Head Screwdriver
- ☐ # 1 Phillips Head Screwdriver
- ☐ Magnum Z-Bend Pliers
- ☐ Needle Nose Pliers
- ☐ Electric Drill
- ☐ 1/16" & 5/64" Drill Bits
- ☐ Excel Modeling Knife
- ☐ Ruler
- ☐ Pencil
- ☐ Masking Tape

Step 1: Installing the Elevator & Rudder Servos



- ☐ Install the rubber grommets and brass collets onto the servo mounting lugs.

☞ When installing the collets, make sure the flanges are toward the bottom of the mounting lugs.



- ☐ Test-fit the two servos onto the servo mounting rails.

☞ Both of the servos' output shafts should face toward the front of the fuselage and the servos should be pushed together and centered on the rails.

- ☐ When satisfied with the alignment, drill 1/16" diameter pilot holes through the servo mounting rails to make it easier to install the mounting screws.

- ☐ Mount the servos using the servo mounting screws provided with your servos.

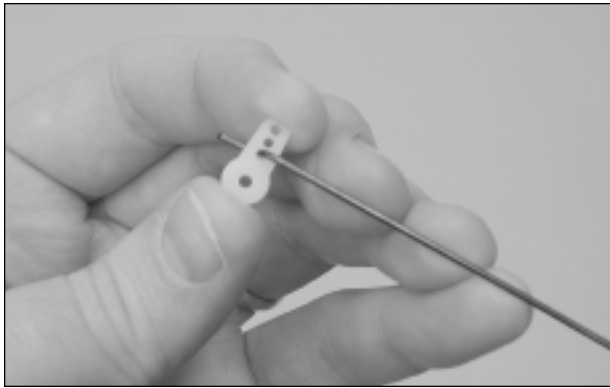
Step 2: Installing the Elevator & Rudder Pushrods

- ☐ Using a modeling knife, cut away and remove the covering material from over the two pushrod exit holes in the back of the fuselage. One hole is located on each side of the fuselage, 2-7/8" in front of the rudder hinge line and 1/2" up from the bottom of the fuselage.

- ❑ Using a modeling knife, cut off all but one arm from two "4-point" servo horns. The remaining arm on each control horn should have at least two holes in it and not be any longer than 3/8".

☞ If the servo arm is longer than 3/8" it will hit the side of the fuselage when installed onto the servo.

- ❑ Using Z-Bend pliers, carefully make a Z-Bend in the plain end of each threaded pushrod wire.



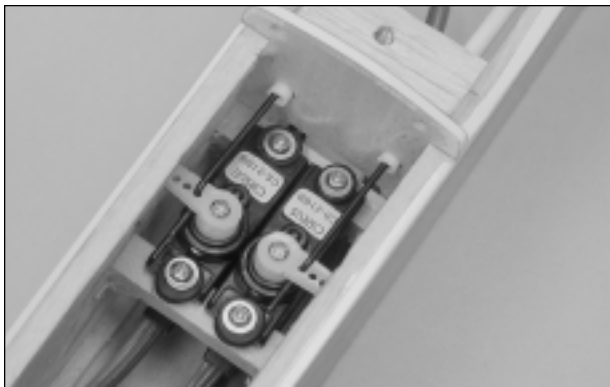
- ❑ Install the Z-Bend in each pushrod into the hole that is 3/16" out from the center of each servo arm.

☞ You may have to enlarge the hole in the servo arms to fit the diameter of the pushrod wire.

IMPORTANT

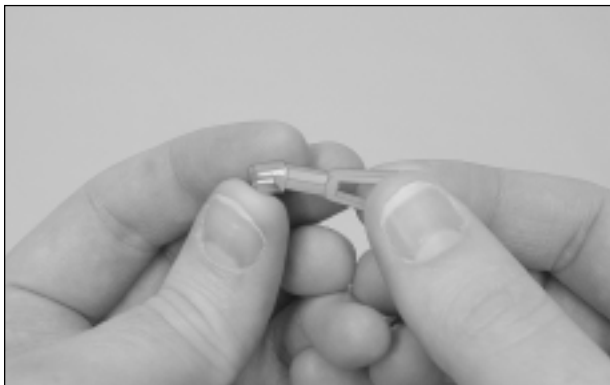
So the pushrod wires line up properly with the servos, the longer portion of the pushrod wires should be toward the top of the servo arms as shown.

- ❑ Plug the elevator and rudder servo leads into their proper slots in your receiver. Plug the ESC lead into your receiver and plug the flight battery into your ESC. Turn on your radio system and center both of the servos using the elevator and rudder trim levers on your transmitter.



- ❑ Slide the threaded end of each pushrod wire into the nylon pushrod tubes.
- ❑ Line up the servo horns with the servos and push the servo horns into place, making sure they are both centered.
- ❑ Carefully install and tighten the servo horn retaining screws, provided with your servos, to secure the servo horns into place.

Step 3: Installing the Elevator Control Horn



- ❑ Using a modeling knife, cut out one 1/4" long piece from the length of clear tubing.
- ❑ Slide the 1/4" long piece of clear tubing onto the base of one nylon clevis.

- ❑ Use several pieces of masking tape, taped between the elevator and the horizontal stabilizer, to hold the elevator centered.



❑ Carefully thread the clevis far enough onto the elevator pushrod wire that the clevis attachment pin is over the elevator hinge line.

☞ The elevator pushrod wire is on the left side of the fuselage. (When looking from the back with the fuselage right-side up.)

❑ Using a modeling knife, cut the nylon backplate away from one nylon control horn and remove any excess flashing from both pieces.



❑ Snap the clevis into the second hole up from the base of the control horn.

❑ Position the control horn on the elevator. The clevis attachment holes should be over the hinge line and the control horn should be lined up with the pushrod wire.

❑ When satisfied with the alignment, use a pencil to carefully mark the locations of the two control horn mounting screws.

❑ Remove the control horn and drill two 5/64" diameter pilot holes through the elevator at the marks you drew.

☞ Be careful to drill the holes straight through the elevator and not at an angle.



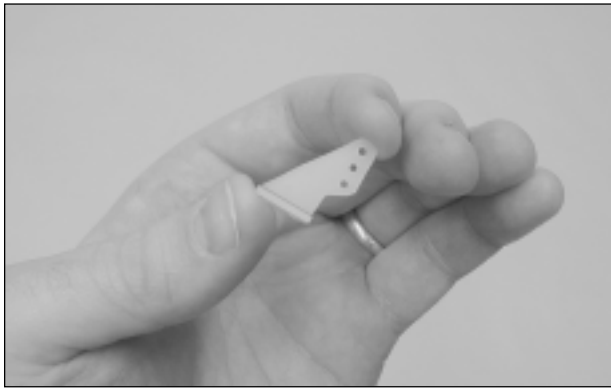
❑ Mount the control horn to the elevator using the nylon backplate and two 2mm x 8mm machine screws.

☞ Don't overtighten the screws. You don't want to crush the elevator.

❑ Snap the clevis into the second hole from the base of the control horn and slide the piece of clear tubing over the clevis to prevent the clevis from opening during flight.

Step 4: Installing the Rudder Control Horn

❑ Using a modeling knife, cut the nylon backplate away from the remaining nylon control horn and remove any excess flashing from both pieces.



❑ Using a modeling knife, carefully cut away the first hole from the base of the control horn as shown.

☞ You must cut this portion of the control away so that the control horn does not hit the side of the fuselage when the rudder is deflected to the right.



❑ Install the rudder control horn to the right side of the rudder using the same technique as installing the elevator control horn. The clevis should be installed into the outermost hole in the control horn.

IMPORTANT

So that the elevator does not hit the rudder control horn when the elevator is deflected down, the rudder control horn should not be mounted too high on the rudder. The centerline of the rudder control horn should be about 7/16" above the base of the rudder.

SECTION 13: FINAL ASSEMBLY

YOU'LL NEED THE FOLLOWING PARTS:

- | | |
|-----------------------------|---------------------|
| ❑ (1) 3mm x 12mm Wood Screw | ❑ (1) Velcro® Strip |
| ❑ (1) 3mm Flat Washer | ❑ (1) Decal Set |

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- | | |
|---------------------------------|------------------------------|
| ❑ # 1 Phillips Head Screwdriver | ❑ Ruler |
| ❑ Wire Cutters | ❑ Pencil |
| ❑ Excel Modeling Knife | ❑ K&S 30 Watt Soldering Iron |
| ❑ Electric Drill | ❑ Heat-Shrink Tubing |
| ❑ 5/64" & 1/8" Drill Bits | ❑ Solder |

Step 1: Applying the Decals

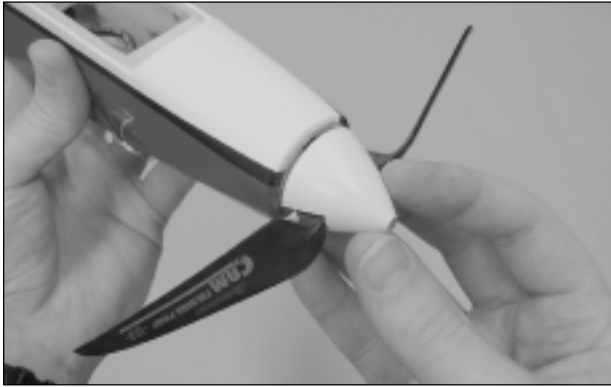
❑ Working with one decal at a time, use a pair of scissors to carefully cut out the decal along its outer edges.

❑ Remove the protective backing from the decal and apply the decal to the airplane. (Use the box cover photos to position the decals.) Lightly rub the decal with a soft cloth to remove any trapped air from beneath it.

☞ If any air bubbles form in the decal you can "prick" the bubble with a straight pin to release the air.

❑ Repeat the steps above to apply the remaining decals. Rub each decal down thoroughly to adhere it into place.

Step 2: Installing the Propeller Assembly



❑ Install your folding propeller assembly following the manufacturer's instructions included with your propeller. We used a Graupner 6 x 3 CAM folding propeller on our Wattage 380 size direct drive motor.

☞ When installing the propeller assembly, make sure that the back of the propeller hub does not rub against the motor screws.

Step 3: Installing the Receiver

The location of the radio equipment shown in the next few steps are only approximate. This is how our test airplanes were set up. The locations of your radio equipment could differ and should be dependent on what type of equipment you use and where you balance your airplane. Balancing will be done in the next section.

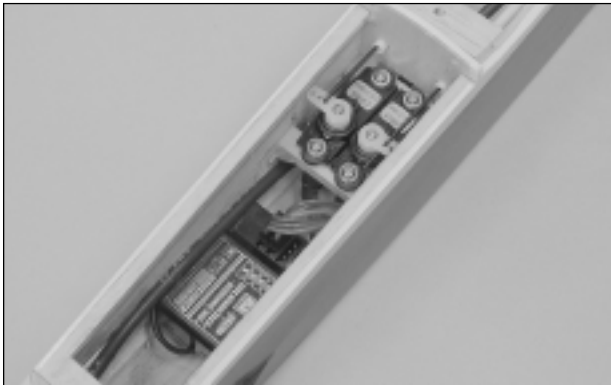
❑ Plug the elevator and rudder servo leads into their proper slots in the receiver.

❑ Uncoil the receiver antenna and feed it through the preinstalled nylon tube and out the back of the fuselage.

☞ If you are having trouble pushing the antenna through the tube, wet the antenna first with some Windex® or similar liquid. Doing this will make the antenna slide through the tube easier.

WARNING

Let the excess receiver antenna hang out the back of the fuselage. Do not cut the antenna shorter. Cutting the antenna will greatly reduce its range and quickly result in a crash.



❑ Mount the receiver on the fuselage floor, in front of the servos, using a small piece of double-sided tape.

Step 4: Installing the Electronic Speed Control

❑ Carefully solder the motor wires to your ESC, being careful that the polarity is correct.

☞ Make sure to use heat-shrink tubing to insulate the solder joints.

❑ The ESC is mounted behind the forward bulkhead, so run the ESC lead under the servos and plug it into the throttle channel slot in your receiver.



❑ Mount the ESC to the fuselage side, right behind the forward bulkhead as shown. Use a small piece of double-sided tape to hold it in place.

☞ Do not mount the ESC next to the receiver. Mounting the ESC near the receiver can lead to radio interference problems and should be avoided.

❑ If your ESC has an on/off switch, mount into the precut switch cutout in the left side of the fuselage, in front of the forward servo mounting rail.

Step 5: Installing the Flight Battery



❑ Mount the flight battery to the fuselage side, opposite the electronic speed control, using the piece of Velcro® provided. To help balance the airplane push the flight battery up against the back of the forward bulkhead.

☞ When the wing is attached to the fuselage, you can access the flight battery through the precut hatch in the bottom of the fuselage. To remove the hatch, pull up on its sides and it will pop out of place.

Step 6: Installing the Forward Hatch Cover

❑ Set the hatch cover in place and align it with the fuselage.



❑ Using a 5/64" drill bit, drill a pilot hole into the hatch cover and through the plywood plate inside the fuselage, 3/8" behind the front of the hatch cover.

❑ Remove the hatch cover and enlarge only the hole in the hatch cover using a 1/8" diameter drill bit.

❑ Set the hatch cover back onto the fuselage and secure it into place using one 3mm x 12mm wood screw and one 3mm flat washer.

☞ Don't overtighten the screw. You don't want to crush the hatch cover.

SECTION 14: BALANCING THE MINI THERMALAIRE EP

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

☐ Ruler

☐ Pencil

IMPORTANT

It is critical that your airplane be balanced correctly. Improper balance will cause your airplane to lose control and crash!

Center of Gravity Location:

2-1/4" back from the leading edge of the wing, at the fuselage sides.

WARNING

This location is recommended for initial test flying. The C.G. can be moved forward or aft up to 1/4", but it is not recommended that the C.G. be located any farther back than 2-1/2".

IMPORTANT

As you move the C.G. further aft, the airplane will become faster and more responsive, especially in pitch. Do not start to move the C.G. back until you are comfortable with the flight characteristics of the airplane.

 Balance the Mini Thermalaire EP with the flight battery installed.

☐ Measure and draw two marks on the bottom of the wing, 2-1/4" back from the leading edge, at the fuselage sides.

☐ With the airplane right side up, place your fingers on the marks and carefully lift the airplane. If the nose of the airplane falls, the airplane is nose heavy. To correct this, move the flight battery back far enough to bring the airplane into balance. If the tail of the airplane falls, the airplane is tail heavy. To correct this, move the flight battery and/or receiver far enough forward to bring the airplane into balance. When balanced correctly, the airplane should sit level or slightly nose down when you lift it up with your fingers at the C.G. location.

 Once you have flown and become familiar with the flight characteristics of the airplane, the C.G. can be moved forward or aft up to 1/4" in each direction to change the flight performance. Moving the C.G. back will cause the airplane to be faster and more responsive, but less stable. Moving the C.G. forward will cause the airplane to be slower and less responsive, but more stable.

Do not fly the airplane beyond the recommended balance range or an uncontrollable crash could result!

SECTION 15: CONTROL THROWS

We recommend setting up the Mini Thermalaire EP using the control throws listed below. These control throws are suggested for initial test-flying because they will allow the airplane to fly smoother and make it easier to control.

TEST-FLYING

Elevator:	1/4" Up	1/4" Down
Rudder:	5/8" Right	5/8" Left

 When measuring the control throws, measure from the widest point of the control surfaces.

Once you're familiar with the flight characteristics of the airplane, you might want to increase the control throws to the sport-flying settings listed below. These control throws will make the airplane more responsive.

SPORT-FLYING

Elevator:	5/16" Up	5/16" Down
Rudder:	3/4" Right	3/4" Left

We do not suggest increasing the control throws beyond the recommended Sport-Flying settings. Higher control throws will cause the airplane to be extremely control-sensitive and result in a possible crash if you are not careful.

👉 If you don't have a radio system that features End Point Adjustments, you can still adjust the pushrods for the desired amount of control throw manually. To increase control throw, move the Z-Bend in the pushrod wires out away from the center of the servo horns or move the clevises in toward the base of the control horns. To decrease control throw, move the Z-Bend in the pushrod wires in toward the center of the servo horn or move the clevises out further from the base of the control horns. Because of the narrow proximity of the pushrod wires to the servo arms and control horns, you may have to make shallow bends in the pushrod wires if you want to change their locations from those recommended in the pushrod installation steps.

SECTION 16: PREFLIGHT CHECK & SAFETY

- Check the operation of the throttle. To do this, do the following:

A) Plug the flight battery into the ESC and turn on the radio system.

WARNING

Do not turn the receiver on unless the transmitter is turned on first. Always turn the transmitter on first. Never allow hands or clothing to get in the way of the propeller when the radio is turned on. Sudden unwanted radio signals, or turning the radio on with the throttle stick set at full throttle, can turn the motor on unintentionally. Always make sure that the throttle control stick is set to idle before turning on the transmitter.

B) When the throttle control stick is at the idle position, the motor should be off. Moving the stick forward should turn on the motor. Gradually moving the stick to the full forward position should result in the motor running at full power.

👉 Some ESCs will give you more proportional control than others. Your ESC may also have a manual control adjustment screw that must be adjusted prior to using the ESC. (Refer to your ESC's operating guide for further information.)

- Cycle the flight battery three times. When NiCD batteries are new they need to be used 2-3 times before they will produce their top voltage and duration. To cycle them, simply charge the battery and then run the motor (at low speed to prevent damaging it) until the motor stops. Allow the battery and motor to cool, then repeat this procedure two more times.
- Check the condition of the transmitter batteries. They should be fully charged.
- Check every glue joint in the airplane to ensure that everything is tight and well-bonded.
- Double-check the balance of the airplane. Do this with the flight battery installed.
- Check the control surfaces. They should move in the correct direction and not bind.

- Check to ensure that the control surfaces are moving the proper amount.
- Check the receiver antenna. It should be fully extended and not coiled up inside the fuselage.
- We do not suggest storing your airplane in an extremely hot environment (like the back of your car in direct sunlight) for any length of time. The extreme heat could cause the covering to wrinkle and possibly damage the fragile components of the radio control system, ESC or batteries.

The following are our general guidelines for your safety and the safety of others. Please read and understand these safety guidelines before going out to the flying field for the first time.

- Do not test-fly your model for the first time without first having it safety-checked by an experienced modeler.
- Do not fly your model higher than approximately 400 feet within 3 miles of an airport without having an observer with you. The observer should tell you about any full-size aircraft, which always have the right of way, in your vicinity.
- When flying at a flying field with established rules, you should abide by those rules. You should not deliberately fly your model in a reckless and/or dangerous manner.
- While flying, you should not deliberately fly behind the flight line. If your model should inadvertently fly behind the flight line, you should change course immediately.
- You should complete a successful range check of your radio equipment prior to each new day of flying, or prior to the first flight of a new or repaired model.
- You should perform your initial turn after take-off away from the flightline and/or spectator area.
- You should not knowingly operate your R/C radio system within 3 miles of a preexisting model club flying field without a frequency sharing agreement with that club.

SECTION 17: FLYING THE MINI THERMALAIRE EP

To prevent damaging the bottom of the airplane, we suggest flying only from soft grass or weeds. Landing on dirt and rocks or on concrete and asphalt will quickly damage the fuselage and propeller.

Hand-Launching the Mini Thermalaire EP

Hand-launching should always be done into the wind! Determine wind direction by tossing some blades of grass into the air and watching which direction they fall.

Turn on the transmitter, then the airborne system. In your throwing hand grasp the airplane from the base of the fuselage, directly below the center of the wing, and hold it up above shoulder level. While keeping clear of the propeller, turn on the motor to full power. The propeller should be spinning at a high rate of speed and you will feel the airplane pulling against your hand. With the motor at full power, firmly toss the airplane straight ahead and level. Do not throw it up or down, or throw it wildly out of control.

After hand-launching, fly the airplane straight ahead and level for about 20 - 30 feet to allow the airplane to build up flying speed. You may need to hold a slight amount of back elevator stick to keep the airplane level and prevent it from descending. Do not try to climb too steeply right after hand-launching or you may stall and crash the airplane. Wait to make your climb until after the airplane picks up sufficient airspeed.

Continued on Next Page

Flying the Mini Thermalaire EP

After you've hand-launched the airplane and the flying speed has picked up, keep the motor running at full power and apply a small amount of back elevator stick to put the airplane into a shallow climb.

☞ Be careful not to over-control. You don't need to move the control stick very much to make the airplane do what you want it to. Moving the control stick too much will only result in the airplane pitching and rolling severely.

After reaching about 80 - 100 feet of altitude you should reduce motor power to about 3/4 to slow the airplane down. After the airplane begins to slow, start making shallow turns to keep the airplane near you.

WARNING

Don't fly the airplane too far away from you or you could lose sight of it.

To turn the airplane, gently move the control stick in the direction you want the airplane to go and hold it for a second or two. After the airplane starts turning in the direction you want it to, let go of the control stick. Because of the polyhedral wing design, the wing will level itself from a shallow turn - after releasing the control stick. If you get into too sharp a turn or if you want to level the wing sooner, move the control stick in the opposite direction that you turned. When the wing levels, release the control stick. Remember, don't over-control.

☞ When going into a turn, the airplane will have a natural tendency to lose some altitude. Unless you want to descend, you should gently pull back on the control stick to keep the airplane level during the turn. The steeper the turn the more altitude the airplane will lose.

WARNING

The longer you hold the control stick over, the tighter radius the airplane will turn in. We recommend gentle turns until you are proficient with the flight characteristics of the airplane. If the airplane always turns one direction or the other, use the trim lever on your transmitter to make the airplane fly level.

The airplane's altitude is controlled by moving the control stick forward and back. If you want the airplane to climb, gently pull back on the control stick. If you want the airplane to descend, gently push forward on the control stick. If you're flying slowly and want to climb, you should increase motor power so that the airplane doesn't stall. If the airplane is flying fast and you want to descend, reduce motor power before descending. This will keep the airplane from flying too fast.

IMPORTANT

If you are flying in a light wind, the airplane will tend to climb as you turn into the wind. In this instance, you will need to level off the airplane by pushing forward gently on the control stick. When you turn down-wind, the airplane will have a natural tendency to lose altitude. In this instance, you should pull back gently on the control stick.

Landing the Mini Thermalaire EP

☞ All landings should be made flying straight into the wind with the wing level.

Turn off the motor. At this point the airplane will begin to descend. Allow the airplane to gradually descend. If the airplane seems to be descending too fast, gently pull back on the control stick to make the airplane slow its descent. This will also slow the airplane down. Once the airplane has slowed down and is descending gradually, release the control stick and allow the airplane to continue its descent. Once the airplane is about 15 feet off the ground make sure the wing is level and continue a shallow descent. Just before touch-down, gently pull back on the control stick to level the airplane with the ground for landing. If you need to make turns during the descent, make shallow, gentle turns. Avoid making steep turns because you could stall the airplane.

WARNING

Although the airplane will fly very slowly, be careful not to allow the airplane to get too slow during landing. If the airplane gets too slow, it could stall and crash. It's better to land at a higher speed than normal until you get more familiar with the airplane.

SECTION 18: BASICS OF THERMAL FLYING

The following is intended for those pilots who have mastered flying the Mini Thermalaire EP. Thermal flying is by far the most difficult aspect of glider flying; however, it can be the most rewarding. For more information on thermals, check your local library or the Internet. There are many books and articles available that detail what thermals are and how they work.

Basically thermal lift is created by areas of warm air rising from the ground. As the ground heats up from the warmth of the sun, the air above it will begin to warm. This is especially true over terrain such as a freshly plowed field or a paved parking area. As the air heats, it will begin to rise and allow cooler air to move in to replace it. This air, in turn, will heat up, rise, and you will get a continuous current of rising air.

Thermal flying is truly an art but there is also a good amount of luck involved in finding the perfect thermal. There are ways to hone your skills so that you can become an artist in flying thermals rather than remain a hopeful novice who blunders into them by accident. The following are some keys to begin the process of becoming a better thermal pilot.

The first key is to become very familiar with the way the Mini Thermalaire EP flies. Knowing the way it responds when entering and exiting thermal lift is essential. There are things you will notice as you fly the airplane more and more. You need to be familiar with the airplane so that you can recognize when it is flying normally and when it is responding to up or down air. It is very hard for the novice to tell what is happening to a new airplane in regards to the air. He or she is uncertain if the movement is due to something that the pilot did or due to air movement. You want the airplane to be properly trimmed out so that it flies smooth and stable and so you know how it responds when you turn. Polyhedral wing designs, like those on the Mini Thermalaire EP, try to remain stable and are easier for the novice to fly than straight wing planes (i.e., wings with no dihedral) and, more importantly, are responsive to hitting the side of a thermal more dramatically than straight wing planes do.

You will seldom hit a thermal straight on in flight. More often you will hit the side of the thermal and it will lift one wing more and literally throw your airplane away from the lift. When your airplane should otherwise be flying level, watch for a sudden lift of a wing tip and turn the airplane into that area. There is a good chance that you hit the side of a thermal and it pushed you away—into the air next to the thermal. Having located a thermal, turn into it and start circling to locate the area of strongest lift. Tighten up the circle to get the maximum rate of climb.

Think of the air as water. No wind is a calm lake. A breeze is a slow moving stream and a heavy wind is a raging river. Often, a pilot hits some lift, starts circling, then goes up and up and stays right in the same spot circling. Then he starts coming down and doesn't understand why. On a calm day, once you hit lift you can circle right there as it isn't going anywhere but up. It may die after a short time, but that happens. With wind, picture your lift as an escalator going downwind at the same rate as the wind is blowing. You hit it and start to circle and you go up, but you must have your circling go downwind at the same speed as the wind to stay on the escalator. The lift is moving and if you don't go with it you lose it.

Watch the tail of the airplane bounce up to see if you are hitting lift. When you fly into a thermal it kicks the tail up and thus points the nose down. Despite this "dive" position your airplane may actually be going up in the lift. It depends on the strength of the thermal. That "up tail" is a sign to watch for in thermal spotting.

Use your visual keys and work on your skills so you can become accustomed to thermal flying. Don't forget to watch the birds, too. If you see birds with their wings stretched out, circling high above, you can be sure they are in a thermal. Launch your airplane and head in that direction. They won't mind you joining them in the fun!

SECTION 19: GLOSSARY OF TERMS

C/A Glue: An acronym for Cyanoacrylate. It dries very fast like "Super Glue." It comes in many different formulas for different uses.

Center of Gravity: Most commonly referred to as the CG or balance point, it is the point at which the airplane is in complete balance in all three axes.

Control Horn: Part of the control system, the control horn is mounted to the control surface. It allows the pushrod to be connected to the control surface. Almost all control horns are adjustable to allow for more or less control surface movement.

Covering: Made out of vinyl or polyester. Covering has heat sensitive adhesive that, when heated, sticks to the wood frame of the airplane.

Covering Iron: A small hand-held iron, usually Teflon® coated. It is used to heat and apply covering material.

Dihedral: The upward angle of each wing half. Dihedral creates more stability which makes learning to fly much easier.

Elevator: The elevator is the control surface on the back of the airplane that moves up and down. This surface controls pitch.

Epoxy: A two-part glue containing a resin and a hardener. Epoxy is available in several drying times and is stronger than C/A glue. Epoxy is used in high stress areas such as joints of wing halves.

Hinges: Usually made out of plastic, nylon or even tape, the hinges connect the control surfaces to the stabilizers or wing. They pivot, allowing the control surface to move.

Horizontal Stabilizer: Mounted in the rear of the airplane, the horizontal stabilizer works with the elevator to control pitch.

Pushrods: They connect between the control surface and the servo, transferring the movement of the servo directly to the control surface.

Pushrod Housing: A tube that is usually nylon. The pushrod tube or wire runs through the housing.

Receiver: The part of the radio system that receives the signals from the transmitter.

Rudder: The rudder is the control surface on the back of the airplane that moves right and left. This causes the nose of the airplane to yaw right and left.

Servo: The part of the radio system that produces the movement necessary to move the control surfaces. The servo includes a small motor, gears and a circuit board.

Servo Rails: Usually made out of hardwood, the servo rails are the mounting base for the servos.

Servo Reversing: An option on almost all new radios. Servo reversing allows you to change the direction a servo rotates by just flipping a switch on the transmitter.

Shear Web: Vertical or horizontal grain balsa that is glued between the top and bottom wing spars to strengthen the wing assembly.

Stall Speed: The speed at which air stops moving fast enough over the surface of a wing to keep the airplane flying.

Thermal: A rising column of hot air. When you fly a lightweight glider into a thermal, the glider will rise along with the hot air.

Transmitter: The part of the radio system that you control. It transmits the control inputs to the receiver, which transfers that information to the servos.

Trim: Small adjustments made to the control surfaces to cause the airplane to fly straight and level without control input.

Trim Lever: A sliding lever on the transmitter that allows you to make small adjustments to the control surfaces from the transmitter.

Vertical Stabilizer: Mounted on the rear of the airplane, it works with the rudder to turn the airplane. It also gives the airplane vertical stability.

Wing Saddle: The portion of the fuselage on which the wing is mounted.

Z-Bend: This is a special bend made in the pushrod wire. While it cannot improve your ability to make adjustments, the Z-Bend is the most secure way to attach the pushrod wire to the servo horn.

PRODUCT EVALUATION SHEET

Telling us what you like and don't like determines what model kits we make and how we make them. We would appreciate it if you would take a few minutes of your time to answer the following questions about this kit and your modeling interests. Simply fold this form on the dotted lines, seal with tape and mail it to us. Do not use staples and make sure our address faces out.

Global Hobby Distributors will not disclose the information it collects to outside parties. Global Hobby Distributors does not sell, trade, or rent your personal information to others. Your privacy is important to us.

- 1) Kit: Wattage Mini Thermalair EP # 128422
- 2) Where did you learn about this kit?

☐ Magazine Ads	☐ Friend
☐ Hobby Shop	☐ Other
☐ Internet	
- 3) What influenced you the most to buy this kit?

☐ Magazine Ads	☐ Price
☐ Type of Model	☐ Box Art
☐ Recommendation	☐ Other
☐ Internet	
- 4) Did you have any trouble understanding the written instructions? If yes, please explain.

☐ Yes	☐ No
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- 5) Did you have any trouble understanding any of the photographs? If yes, please explain.

☐ Yes	☐ No
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- 6) Were any of the kit parts:

☐ Damaged	☐ Wrong Size
☐ Missing	☐ Wrong Shape

If you checked any of the boxes above, did you contact our Customer Service Department to resolve the problem?

☐ Yes	☐ No
------------------------------	-----------------------------
- 7) Was any of the assembly difficult for you? If yes, please explain.

☐ Yes	☐ No
------------------------------	-----------------------------

- 8) What did you like most about this kit?

☐ Assembly Manual	☐ Parts Fit
☐ Hardware Supplied	☐ Price
☐ Other	

- 9) What did you like least about this kit?

☐ Assembly Manual	☐ Parts Fit
☐ Hardware Supplied	☐ Price
☐ Other	

- 10) Are you satisfied with the finished model? If no, please explain.

☐ Yes	☐ No
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- 11) How does this kit compare to similar kits by other manufacturers?

☐ Better	☐ As Good
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What is Your Age Group:

☐ 10 & Under ☐ 11 - 20 ☐ 21 - 30 ☐ 31 - 40 ☐ 41 - 50 ☐ 51 - 60 ☐ 61 - 70 ☐ 71 +

How Many Years Have You Been in the Hobby?

☐ Less than 1 ☐ 2 - 4 ☐ 5 - 7 ☐ 8 - 10 ☐ 11 - 15 ☐ 16 - 20 ☐ 20 or More

How Many Models Have You Purchased In the Last Year?

☐ 0 - 1 ☐ 2 - 4 ☐ 5 - 7 ☐ 8 - 10 ☐ 10 or More

Please List any Other Modeling Interests or any Additional Information about This Product: _____

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